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INSIDE

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Suspected Bioterrorism Events: Clinical Recognition and Management

NEWS ALERT

The following comments are adapted from Health Alert No. 6, October 5, 2001, from the city of New York's Department of Health. We feel they will be of value to our readers who must be aware of issues presented by potential bioterrorist events.

By Frank Bia, MD, MPH

Health care providers in travel medicine should be alert to illness patterns and diagnostic clues that might signal an unusual infectious disease outbreak due to the intentional release of a biological agent and should report these concerns immediately to their local health authorities and to the Geosentinal Alert Network. More detailed references with information on the clinical presentation, laboratory diagnosis, medical management, and preventive measures for the more likely bioterrorist agents (eg, anthrax, plague, or smallpox) are provided at the end of this section.

Unlike a chemical or nuclear release, the covert release of a biological agent will not have an immediate impact because of the delay between exposure and illness onset. Consequently, the first indication of a biologic attack may only be recognized when ill patients present to physicians or other health care providers for clinical care.

Look for the following clinical and epidemiological clues that may be suggestive of a possible bioterrorist event:

- Any unusual increase or clustering in patients presenting with clinical symptoms that suggest an infectious disease outbreak (eg, > 2 patients presenting with an unexplained febrile illness associated with sepsis, pneumonia, adult respiratory distress, mediastinitis, or rash; or a botulism-like syndrome with flaccid muscle paralysis, especially if occurring in otherwise healthy individuals).
- Any case of a suspected or confirmed communicable disease that is not endemic in your immediate area (eg, anthrax, plague, tularemia, smallpox, or viral hemorrhagic fever) or that occurs in a person without a travel history to an endemic area.
- Any unusual age distributions for common diseases (eg, a cluster of severe chickenpox-like illness among adult patients who all report a previous history

of varicella infection).

- Any unusual temporal and/or geographic clustering of illness (eg, persons who attended the same public event or religious gathering).
- Any sudden increase in the following nonspecific syndromes, especially if occurring in previously healthy individuals and if there is an obvious common site of exposure:
  Fever with respiratory, rash, or gastrointestinal illness;
  Encephalitis or meningitis;
  Neuromuscular illness (eg, botulism);
  Bleeding disorders;
  Simultaneous disease outbreaks in human and animal populations.

Some infections caused by potential bioterrorist agents present with distinctive signs that can provide valuable diagnostic clues. In previously healthy persons presenting with a febrile illness, the following signs and symptoms are highly suggestive of infection with certain biological agents:

- Widened mediastinum with fever and sepsis—**Inhalational anthrax.**
- Pneumonia with hemoptysis—**Pneumonic plague.**
- Vesicular/pustular rash starting on face and hands, with all lesions at the same stage of development—**Smallpox.**

Most pathogens that could be used as a biologic weapon (eg, anthrax, plague, and smallpox) would present initially as a nonspecific influenza-like illness. Therefore, an unusual pattern of respiratory or influenza-like illness (eg, occurring out of season or in large numbers of previously healthy patients presenting simultaneously) should prompt clinicians to alert health authorities. These disease patterns might represent an early start to the influenza season or the introduction of a new pandemic strain of influenza, or could be the initial warning of a bioterrorist event.

For more detailed clinical information on specific pathogens that might be used in a bioterrorist event, please consult the following references or web sites:

- American College of Physicians.
  http://www.acponline.org/bioterr/
- American Society of Microbiology.
  http://www.asmusa.org/pcsrc/bioprep.htm
- Association for Infection Control Practitioners.
  http://www.apic.org/bioterror/
- CDC Bioterrorism Preparedness and Response.
  http://www.bt.cdc.gov
- Infectious Disease Society of America.
  http://www.idsociety.org
- Johns Hopkins Center for Civilian Biodefense.
  http://www.hopkins-biodefense.org (The Johns Hopkins Center for Civilian Biodefense has written consensus guidelines on the medical and public health management of the primary bioterrorist agents, including smallpox, anthrax, botulism, plague, and tularemia. These guidelines were published in the *Journal of the American Medical Association* and archived copies are available at http://jama.ama-assn.org).
- US Army Medical Research Institute of Infectious Diseases:
  http://www.usamriid.army.mil/education/bluebook.html

Inhalational Anthrax

Epidemiology

- Anthrax can be transmitted by inhalation, ingestion, or inoculation. (Inhalation is the most likely route during a bioterrorist attack.)
- The spore form of anthrax is highly resistant to physical and chemical agents; spores can persist in the environment for years.
- Anthrax is not transmitted from person to person.

Clinical

- Incubation period is 1-5 days (up to 43 days reported in the literature).
- Biphasic illness, with initial phase characterized by nonspecific flu-like illness followed by an acute phase with a rapid clinical deterioration characterized by acute respiratory distress and toxemia (sepsis).
- Inhalational anthrax presents as acute hemorrhagic mediastinitis.
- Chest x-ray findings: Mediastinal widening in a previously healthy febrile patient is highly suggestive of anthrax. Parenchymal infiltrates are uncommon.
- Mortality rate for inhalational anthrax approaches 90%, even with antibiotic treatment.

Diagnosis

- Laboratory specimens should be handled in biosafety level 2 facilities.
- Gram stain shows large, Gram-positive encapsulated bacilli, occurring singly or in short chains, often with squared off ends (safety-pin appearance). In advanced disease, a gram stain of unspun blood may be positive.
- Distinguishing characteristics on culture include: non-hemolytic, nonmotile, capsulated bacteria that are susceptible to gamma phage lysis, with a characteristic consistency of "beaten egg whites" when colonies are picked with an inoculating loop.
- Positive specimens would be sent to the Centers for Disease Control and Prevention for additional testing.

Treatment

- Prompt initiation of antibiotic therapy is essential, and antibiotic susceptibility testing is *key* to guiding treatment.
- Ciprofloxacin (400 mg IV q 12 h) is the antibiotic of choice for penicillin-resistant anthrax or for empiric

therapy while awaiting susceptibility results (alternative: doxycycline).
- Females who are pregnant (or who may be pregnant) and children younger than 8 years old also can be treated empirically with a quinolone (alternative: doxycycline).
- Natural strains of anthrax are resistant to extended-spectrum cephalosporins, trimethoprim, and sulfamethoxasole.
- Antibiotic treatment should continue for 60 days.

Prophylaxis

In the event that an outbreak of inhalational anthrax was confirmed or suspected, all exposed persons should receive antibiotic prophylaxis.

- Start antibiotic prophylaxis as soon as possible after exposure with either ciprofloxacin 500 mg p.o. b.i.d. or doxycycline 100 mg p.o. b.i.d. (If strain is penicillin-susceptible, therapy can be switched to penicillin or amoxicillin).
- Currently, anthrax vaccine is in limited supply and not available to the general public. If vaccine is made available in the event of a confirmed outbreak, exposed persons can be vaccinated with 3 doses of anthrax vaccine (Days 0, 14, and 28) at the same time that they are taking antibiotic prophylaxis. If this dual regimen is followed, antibiotics need to be administered for a total of 30 days.

Patient Isolation

- Standard precautions. Patients with anthrax of any form do not require isolation. ❖

Yellow Fever Vaccine—Adverse Events

ABSTRACTS & COMMENTARY

Synopsis: *Yellow fever vaccine has been one of the most extensively used vaccines in the world during much of the 20th century. Because its reported complication rate has been so low, these recent reports are of concern but should not yet affect our current use of the available vaccines.*

Sources: Martin M, et al. Fever and multisystem organ failure associated with 17D-204 yellow fever vaccination: A report of four cases. *Lancet*. 2001;358:98-104; Vasconcelos PFC, et al. Serious adverse events associated with yellow fever 17DD vaccine in Brazil: A report of two cases. *Lancet*. 2001;358:91-97; Chan RC, et al. Hepatitis and death following vaccination with 17D-204 yellow fever vaccine. *Lancet*. 2001;358:121-122.

Serious adverse events associated with yellow fever (YF) vaccine have been reported recently. In spite of these reports, adverse events following YF vaccination remain rare. YF remains a serious risk in South America and Africa, and vaccination for persons at risk should be continued. However, physicians should be vigilant in detecting and reporting adverse events associated with YF vaccination, and the safety of the vaccine is being further evaluated.

Seven cases of serious adverse events in YF vaccinees were reported in the July 14, 2001, issue of the *Lancet*. Four cases occurred in the United States, and 1 in Australia following use of the 17D-204 vaccine. Two cases were reported from Brazil, following use of the 17DD vaccine.

In the US and Australian patients, illness occurred 2-5 days after administration of the 17D-204 YF vaccine. All US cases were older than 62 years of age, and the Australian patient was 56 years old. All cases presented with fever and subsequently developed thrombocytopenia, lymphopenia, bandemia, significant hyperbilirubinemia, and hypotension. All patients developed renal failure, respiratory failure, or both. The vaccine strain of YF virus was isolated from the serum of 2 US patients and the cerebrospinal fluid of 1 US patient. One patient's liver biopsy, performed 28 days after vaccination, showed YF fever virus antigen by immunohistochemical assay. The Australian patient's serum samples as well as multiple organs showed the vaccine strain of YF virus.

The 2 Brazilian cases presented similarly with fevers, myalgia, and vomiting. Following immunization with the 17DD YF vaccine, the patients developed icterus, hemorrhage, and multi-organ involvement. In contrast to the other patients, the Brazilian patients were only 5 and 22 years old. None of the patients were known to be immunosuppressed at the time of vaccination. YF virus was isolated from blood and multiple organs in both patients.

COMMENT BY LIN H. CHEN, MD

Yellow fever virus is an enveloped, single-stranded RNA virus in the *Flaviviridae* family. The vectors are tree hole-breeding mosquitoes, which feed primarily on monkeys in the jungle, and *Aedes aegypti*, a domestic mosquito that thrives in urban settings. YF occurs only in sub-Saharan Africa and parts of South America. It has never occurred in Asia, the Indian subcontinent, the Middle East, and Australia, although the mosquito vector is present.

The incidence of YF is thought to be greater than

200,000 cases annually in Africa, with a case-fatality rate of 23%.[1] In comparison, the incidence in South America is estimated to be 1000-20,000 cases annually, with a case-fatality rate of 65%.[1] Epidemics in the 1990s, which occurred in Nigeria, Cameroon, Ghana, Liberia, Gabon, Senegal, Benin, and Kenya, have contributed to a resurgence of YF.[1,2]

Clinical presentation for YF is variable, ranging from an influenza-like illness to hemorrhagic fevers. Following the bite of an infected mosquito, the infection incubates for 3-6 days before fever develops. Patients then enter a "period of infection" in which they are viremic up to several days.[1] Symptoms during this period include fever, chills, malaise, headache, myalgia, nausea, and anorexia. Findings include toxic appearance, conjunctival congestion, pointed red tongue with a central white coating, relative bradycardia, leukopenia, and neutropenia. A "period of remission" follows and lasts 2-24 hours.[1] Some patients may recover at this point, but many go on to a "period of intoxication" where fever increases along with nausea, vomiting, abdominal pain, jaundice, renal failure, and hemorrhages.[1] A "terminal period" follows with death occurring on the 7th to 10th day of illness.[1]

A diagnosis of YF is made by culturing the virus from blood or serum during the first 4 days of symptoms.[1] Serologic studies with the enzyme-linked immunosorbent assay (ELISA), especially the IgM-capture immunoassay, can establish a diagnosis. Postmortem diagnosis can be made by histopathology as well as immunocytochemical staining of liver tissue sections to detect YF antigen. The liver should never be biopsied during YF infection, as hemorrhage can lead to death.

The YF vaccine has long been considered a safe vaccine, and it has been successful in controlling YF. Live attenuated vaccines were developed shortly after isolation of the YF virus in 1927, and the 17D vaccine has been in use since 1937. The 17D-204 and 17DD vaccines are substrains derived from the 17D strain. Approximately 300 million doses of the 17D YF vaccines have been administered in endemic areas, and approximately 8 million US travelers have been vaccinated since 1965.[3] The World Health Organization estimated that 54 million doses of the vaccine were administered in Brazil in the past 4 years, during which the 2 cases of serious adverse events were reported.[4]

Adverse events following administration of the 17D vaccines have been reported in the past, although most have been mild. These include fever, headache, backache, local reactions, and mild flu-like symptoms.[5] Encephalitis following vaccination has occurred rarely and primarily in very young infants, the incidence of which is estimated at 0.5-4/1000,[5] which is the reason the vaccine is generally not recommended for children younger than 9 months of age. Allergic reactions associated with the 17D vaccine have been reported, and the incidence is estimated at 5-20 per million doses.[5]

The reported rate for YF vaccine-associated serious illness appears to be higher in the elderly. The rate is estimated to be 3.5 per 100,000 among people 65-75 years old and 9.1 per 100,000 for people 75 or older.[6] However, the overall systemic adverse events are still rare at 2.4 per 100,000 doses in the United States.[6] The itinerary of each traveler should be carefully assessed for necessity of the vaccine. YF remains a serious threat to travelers going to endemic areas in Africa and South America, and vaccination should be continued for the travelers at risk.

VAERS report forms can be obtained by telephone (800-822-7967) or at http://www.vaers.org. Reports can be submitted by fax (877-721-0366), mail (P.O. Box 1100, Rockville, MD 20849-1100), or e-mail (info@vaers.org). The CDC will perform virologic and immunohistochemical studies on specimens available. ❖

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Avoid Brucellosis During Pregnancy

ABSTRACT & COMMENTARY

Synopsis: *Travel during pregnancy carries some unique risks of infectious disease exposures, but most occur in situations that can be readily avoided. These include remote treks to destinations where medical care is not accessible in an emergency, exposures to environmental and pharmaceutical agents that are not anticipated, and to infectious agents that can do harm to both mother and fetus—some with potentially disastrous results. This study from Riyadh, Saudi Arabia, is important, since it documents and, once again, reminds us about a rate of abortion associated with human brucellosis that far exceeds the rates for any other infectious bacterial pathogen likely to be encountered by pregnant women during their travels.*

Source: Khan MY, et al. Brucellosis in pregnant women. *Clin Infect Dis*. 2001;32:1172-1177.

Khan and colleagues are based at the king Fahad National Guard Hospital in Riyadh, Saudi Arabia, which serves the Saudi National Guard soldiers and extended families at secondary and tertiary levels of medical care. However, many of these soldiers come from Bedouin tribes in which milk is obtained from goats, camels, or sheep and not pasteurized. Many of these animals have been shown to be infected with brucellosis. The known seropositivity rate for human brucella infections in Saudi Arabia runs quite high, at about 15%. In their retrospective review of a medical record database from 1983 through 1995, a total of 545 patients with a discharge diagnosis of brucellosis were identified, of which 92 (17%) infections occurred during pregnancy —a rate of 1.3 cases of brucellosis in pregnant women per 1000 delivered obstetrical discharges. The diagnosis of brucellosis was based upon a compatible clinical history and a serum agglutinin titer of ≥ 1:320, or a positive blood culture result. For the purposes of this study, they defined spontaneous abortions as fetal deaths occurring at ≤ 24 weeks' gestation. Deaths that occurred at > 24 weeks' gestation were designated intrauterine fetal deaths. The mean age of women in the study was approximately 27 years; 71 had 3 or more pregnancies prior to this study and 86 had never before experienced a spontaneous abortion. Nearly half of the 92 presented during their second trimester.

Sadly, the results were all too impressive. Among the 92 cases of pregnant women with acute brucellosis, 40 (43%) had spontaneous abortions during the first or second trimesters and 2 additional patients experienced intrauterine fetal deaths in their third trimesters. The occurrence rates for abortions among women with brucellosis in their first and second trimesters were higher than in their third trimester (*see Table*). The rates, for comparison, among all women in Saudi Arabia were 2.8% in the first and second trimester, as compared to the 52-64% rates of spontaneous abortion during the first and second trimesters among women with acute brucellosis in this study.

The rate of intrauterine fetal death among all pregnant women in Saudi Arabia during their third trimester was calculated to be approximately 0.3%, whereas pregnant women with brucellosis in this study also experienced 2 intrauterine fetal deaths (8%), likely reflecting a significantly higher risk.

Khan et al showed no relationship between the magnitude of serum agglutinin titers and either the occurrence of bacteremia or spontaneous abortion. Blood cultures were positive in 22/52 (42%) of women who were tested as part of their evaluation and of those characterized as to *Brucella* spp nearly all were *Brucella melitensis*. Antepartum treatment, with a combination regimen of antimicrobial agents such as cotrimoxazole and rifampin, appeared to be highly protective against fetal loss. Of the 92 women with acute brucellosis during pregnancy, 41 received antepartum antimicrobial therapy. Among women in this treated group, there were only 3 spontaneous abortions and 1 fetal death out of a total of 42 such events in the entire study (ie, the total incidence of spontaneous abortion and fetal death was 46% but almost all occurred in the untreated group).

COMMENT BY FRANK J. BIA, MD, MPH

Referring to his classic monograph on brucellosis, Khan et al quoted Dr. Wesley Spink stating "*. . . the passage of time has produced no definitive evidence that the Brucellae produce abortions any more frequently than do other species of bacteria*." Reading further into the original text Spink clearly does recognize that "*…like any other severe bacterial infection with invasion of the blood stream, brucellosis can and does induce abortions and miscarriages, particularly the disease caused by Br. melitensis*."[1] However, he appears to attribute these adverse effects nonspecifically to a bacteremia that was perhaps no different than any other bacteremia in this regard. Spink also recognized that infection of the human fetus in utero had been reported much earlier in the last century.

The first large series to define a causative relationship between brucellosis and abortions in humans was reported from Spain by Criscuolo and di Carlo in 1954.[2] They

Table

Occurrence of Spontaneous Abortion and Intrauterine Death, According to Trimester of Pregnancy, in 92 Women with Acute Brucellosis in Saudi Arabia

Trimester of Pregnancy	No. of patients	No.(%) of spontaneous abortions
First	23	12 (52)
Second	44	28 (64)
Third	25	2 (8)†
Total	92	42 (46)†

Note: Difference in the incidence of abortion was significant for first vs. third trimester ($P < .001$) and second vs. third trimester ($P < .0001$), but not for first vs. second trimester.

† These either were or included intrauterine fetal deaths.

Adapted from: *Khan MY, et al. Brucellosis in pregnant women. Clin Infect Dis. 2001;32:1172-1177.*

studied 200 women with active brucella infections, and abortions occurred in 52, for a rate of 26%. Spink had also been aware of and referenced their publication. In 1980, Schreyer and colleagues reported 1 case of maternal Gram-negative septic shock and disseminated intravascular coagulation with intrauterine fetal death in the second trimester caused by *B melitensis*.[3] By 1990, Sharif and colleagues had tested 537 pregnant women from rural Saudi Arabia, 24 of whom were symptomatic with brucellosis.[4] Dividing their 42 seropositive women into those with brucella antibody titers above and below 1:160, they demonstrated an abortion incidence rate of 17.6% among the 30 women in the high-titer group. The remaining 12 women with lower titers had an incidence of 7.7%. Recent studies of 400 cases of brucellosis from Kuwait indicated a 31% rate of abortion among 35 pregnant women in that series; a similar 41% rate of abortion occurred among 30 pregnant women reported by Madkour, one of whom had experienced recurrent abortions after 5 normal full-term pregnancies.[6] In 1998, Makhseed and colleagues, also from Kuwait, used maternal enzyme-linked immunosorbent assays and conception product cultures for *Brucella* spp to again demonstrate a correlation between infection and preterm or intrauterine fetal death.[7] Hackmon and colleagues presented 7 additional cases of brucellosis in the Hebrew literature from Soroka Medical Center in Beer Sheba.[8] One case was complicated by preterm, premature rupture of membranes and preterm delivery in the 20th week; 2 other cases experienced preterm delivery, 1 with associated chorioamnionitis. Of the remaining 4 who delivered at term, 2 developed postpartum endometritis and 1 had preterm premature rupture of membranes.

In 1907, the Mediterranean Fever Commission had documented the isolation of *B melitensis* for the milk of 2 nursing women without evidence of any resulting infection in the nursing child.[9] Recently, Cokca and colleagues reported a pregnant woman in Turkey with bilateral breast abscesses due to *B melitensis*.[10] First reported in Malta during 1907 by E.M. Williams,[11] Shamo'on and Izzat again reported a case of congenital brucellosis from Amman, Jordan, in 1999.[12]

Khan et al correctly point out that there are few data available regarding other microbial bacteremias with which to compare this study. Their search of the literature with regards to other bacteria such as *Escherichia coli* and *Salmonella* spp produced a single report of 30 pregnancies complicated by typhoid fever resulting in 3 spontaneous abortions (10%). Similar numbers appeared in a study of 10 pregnant women with *Campylobacter jejuni* infections during pregnancy in which one patient developed premature labor resulting in neonatal death. In essence, it simply may not be maternal bacteremia alone that represents the risk factor for spontaneous abortions in brucellosis.

The human placenta and fetus do *not* contain erythritol, a constituent of normal ungulate fetal and placental tissue that promotes overwhelming *Brucella* infections. Yet, despite the absence of bacteremia, erythritol or histopathological changes in the placenta, active human brucellosis is clearly associated with high rates of spontaneous abortion. The good news in the current study appears to be that early antimicrobial therapy with agents such as combined cotrimoxazole and rifampin, which are safe during pregnancy, may prevent such an outcome.

Travelers to areas where brucellosis is endemic have always been at risk for systemic brucella infections that have been sometimes difficult to diagnose and even gone on for years.[12,13] However, travel during pregnancy is another issue, particularly when it comes to brucellosis. The documented rates of abortion, miscarriage, prematurity, and fetal death are far too high and now too well-documented, to take chances with acquiring this disease. No satisfactory vaccines against human brucella infections are available.[14] Consumption of unpasteurized dairy products, including raw milk and cheese products, are the most likely sources of infection for pregnant women as opposed to occupational exposures in veterinarians, farmers, and abattoir workers. Pregnant women should first assure themselves that such food sources have clearly undergone pasteurization, or simply avoid them entirely. ❖

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Travelers and STDs

ABSTRACT & COMMENTARY

Synopsis: *Travelers as a group are at higher risk for acquiring sexually transmitted diseases (STDs). Travel impacts upon human sexual practices by splitting fixed sexual partnerships, removing social taboos that may inhibit sexual freedom, and allowing for escape from standardized behaviors regarded as acceptable by society. Prevention unfortunately plays a small role, if any, in some travel clinic practices.*

Source: Matteelli A, Carosi G. Sexually transmitted diseases in travelers. *Clin Infect Dis*. 2001;32:1063-1067.

Several studies have reviewed sexually transmitted infection and risk behavior among short-term travelers. The review by Matteelli and Carosi summarized studies that demonstrated the effects of STDs on travelers. In an Australian study, 66% of individuals going to Thailand either specifically planned, or hoped to have, a sexual experience during their trip. In a study from Nottingham, England, 5% of 354 travelers had a sexual relationship and less than one third consistently used a condom. A study from patients at a genitourinary clinic in London found that the rate of sexual exposure abroad was 51% among heterosexual males, 36% among homosexual males, and 20% among women. Casual sex occurred even more frequently among long-term travelers abroad. This represents an important subgroup for which this topic is often overlooked in pretravel counseling.

Several studies have attempted to ascertain objective criteria to identify those travelers who have a higher risk of having casual sexual intercourse abroad. Male sex, single status, age younger than 20 years, traveling without a partner, persons having had 2 or more sexual partners in the previous 2 years, casual users of illicit drugs or excessive alcohol, and visitors returning to the same destination more than twice—all were associated with increased risk for acquiring an STD.

It is difficult to establish the exact risk of acquiring any particular STD at a given destination. STD risks in travelers are mathematically derived from the product of the rate of partner exchange and the prevalence of STDs in the contact population in the destination country. In 1995, the worldwide estimated incidence of curable STDs (ie, gonorrhea, chlamydia, and syphilis) was 150 million and 65 million cases in southeast Asia and sub-Saharan Africa, respectively, compared with 14 million and 16 million in North America and Europe, respectively. These figures do not include HIV, hepatitis B & C, herpes simplex virus, and human papillomavirus.

Matteelli and Carosi concern themselves with the following question: why is there no role for prophylactic antibiotics in preventive treatment of STDs? First and most importantly, chemoprophylaxis may confer a false and dangerous sense of protection. Instead, treatment of STDs should be of high quality and carefully administered on the basis of best available current guidelines. The traveler who acquired and was treated abroad for an STD should again be evaluated to ensure that optimal practices were followed. Matteelli and Carosi maintain correctly that even asymptomatic travelers who had casual sex abroad must be screened for STDs, including infections associated with HIV, hepatitis B virus (HBV), syphilis, *Chlamydia trachomatis*, and *Neisseria gonorrhoeae*.

COMMENT BY JOHN D. CAHILL, MD, & MARIA D. MILENO, MD

STDs are an important part of travel medicine that can too easily be overlooked. Travelers, and young trav-

elers in particular, are important target populations in the prevention and control of STDs. Travel clinics are surely useful arenas for both education and counseling of individuals who are at higher risk for acquiring STDs. We find the subject is best addressed during a discussion of HBV risk among travelers.

In the currently reviewed article, the risk of acute HBV in travelers was estimated at 8-24 per 10,000 per population per month, with a case fatality rate of 16-48 per million population per month. Travelers who are at increased risk of HBV can be identified and offered the HBV vaccine—if they have either not already received it or have not completed a full series. This is often the case since many travelers in their 20s or older did not receive vaccine at birth or did not have routine HBV immunization requirements for school entry. The risk group for HBV is broad and includes more than those who are at risk sexually, such as long-term travelers whose occupations (eg, medical volunteer work) put them at risk. Travelers who will be abroad more than a month should be offered the HBV vaccine, which might be given on an accelerated schedule (days 0, 7, 21, and 1-year booster).

Matteelli and Carosi note the above risk factors in travelers for acquiring STDs. In the context of summarizing HBV risks, a frank discussion of the presence of other STDs should also occur. Travelers can simply be reminded of the risks, the definition of safe sex practices, and seeking further evaluation if they have had questionable sexual encounters abroad. Besides the devastating effects that acquisition of an STD, such as HIV, can have on an individual, it is clear that travelers in many different categories may be at risk of transporting HIV to their home countries and home environments. ❖

CME Questions

6. Which one of the following statements regarding the 17D yellow fever vaccine is *false*?

a. The 17D yellow fever vaccine is a live-attenuated virus vaccine.
b. The 17D vaccine has been in use for more than 60 years.
c. The 17D yellow fever vaccine has commonly been associated with adult encephalitis.
d. The 17D vaccine is generally not recommended for children younger than 9 months of age.
e. Serious adverse events associated with the yellow fever vaccine should be reported.

7. Which one of the following statements regarding brucellosis is *false*?

a. High human placental levels of erythritol favor the growth of *Brucella* spp and predispose humans to spontaneous abortions.
b. Raw milk and milk products are the major potential risk exposures for traveling women.
c. The human fetus is at greatest risk of demise from brucella infections during the first and second as opposed to the third trimester of pregnancy.
d. Vaccination for humans is not available against brucellosis.
e. Treatment of pregnant women with brucellosis using a combination of cotrimoxazole and rifampin improves outcomes in pregnancy.

8. Increased risk for the acquisition of STDs is associated with each of the following factors *except*:

a. male sex.
b. travel with more than 1 partner.
c. long-term travel abroad or return to the same destination more than twice.
d. use of illicit drugs or excessive alcohol.
e. single status of traveler.